

February 28, 1998

TO: Mike Kristan - Port of Seattle
FROM: Warren Hansen - Onsite Enterprises, Inc.
Warren Hansen
CC: Elizabeth Stetz - Port of Seattle
Doug Hotchkiss - Port of Seattle

RE: Silver Bay Logging Site: Budgetary Evaluation of Remedial Alternatives and Costs for Contaminated Sediment in Slip No. 3 - Duwamish Waterway.

Dear Mr. Kristan:

As a follow-up to the Phase I Environmental Site Assessment prepared for the Silver Bay Logging Site (Onsite 1998), and as requested by the Port of Seattle, Onsite Enterprises has undertaken an initial evaluation of potential future remediation costs associated with known contaminants in the adjacent Slip 3 sediment. Although there are no existing orders or agreements to address contamination on the submerged portion of the Silver Bay property (Figure 1), the Port needs to be concerned about potential future requirements and costs and how they might impact the Port's liability. This memo does not include an evaluation of legal or institutional risk. Rather, it provides a rough estimate of future remediation costs so they may be considered in the overall determination of the property's potential net worth.

TWO REMEDIATION ALTERNATIVES

Two general remediation approaches were evaluated: dredging and capping. A third alternative: complete filling of Slip 3, was not included since it was assumed that the continued existence of adjacent navigable water is one of the principle reasons the Port is interested in this particular site (i.e., as a possible access point for tribal fishing in the Duwamish).

LIMITATIONS

It is important to note that this analysis was based on a rough estimates of capping areas, methods, sediment volumes and other factors; and was not based on engineering design that would be needed to actually implement any of the examined alternatives. The area of the slip used for "take-off" estimates was limited to the boundaries contained in the property's legal description. If actual remediation were to be conducted, it is likely the action would encompass the entire slip. However, only the area in the Silver Bay property was included for this analysis. In actuality, remediation costs could be attributed to individual upland site owners through a number of different schemes, including documented contributions to the original release of contaminants (such a scheme would

probably reduce or minimize Silver Bay's allocation). Nevertheless, absent such a detailed allocation, the best method for estimating potential costs at this point is through an evaluation of the engineering, construction and disposal requirements for the contaminated sediment within the confines of the property. It is important to understand that dredging conditions, availability of suitable staging locations, cap placement difficulties, changes in available sediment disposal options, permitting requirements and other factors can cause actual project costs to vary significantly (up to several orders of magnitude).

BUDGETARY COSTS

Tables 1 and 2 present budgetary cost estimates for the two general remedial alternatives (dredging and capping). In 1998 Dollars, they are \$ 930,000 and \$56,000, respectively. The large difference in cost between the two actions demonstrates why, to date, remedial dredging of highly contaminated sediment in the Duwamish and other areas of Puget Sound has been avoided. You will probably want to assume some type of capping action for purposes of estimating likely future costs.

ADDITIONAL DISCUSSION

The actual feasibility of each remedial option was not considered to determine if 1) sufficient depth exists in Slip 3 to accommodate a cap, or 2) if there would be sufficient disposal capacity for sediment determined to be regulated under PSDDA and/or the State of Washington (Dangerous Waste rules). The current estimated depth at dockside varies significantly due to tidal fluctuations in Puget Sound. A cap would reduce the depth of the slip by as much as 2 ft, and this could interfere with navigation in the slip under certain tidal conditions. There would also be concern for the cap's integrity if barges or other vessels continued to ground on it at low tides.

The estimated cost for dredging assumes spoils would require dewatering, pre-treatment necessary to meet land-disposal restrictions, and transport to a hazardous waste landfill (Arlington, Oregon). In actuality, additional sampling might demonstrate that some of the dredged material could be managed by less costly methods. Existing contaminant data for in-place sediment must be confirmed by additional testing once the material is removed and dewatered (becomes a "waste").

I hope this evaluation is useful to the Port in evaluating the subject property. If I can answer any questions. Please do not hesitate to contact me at 425) 883-2391.

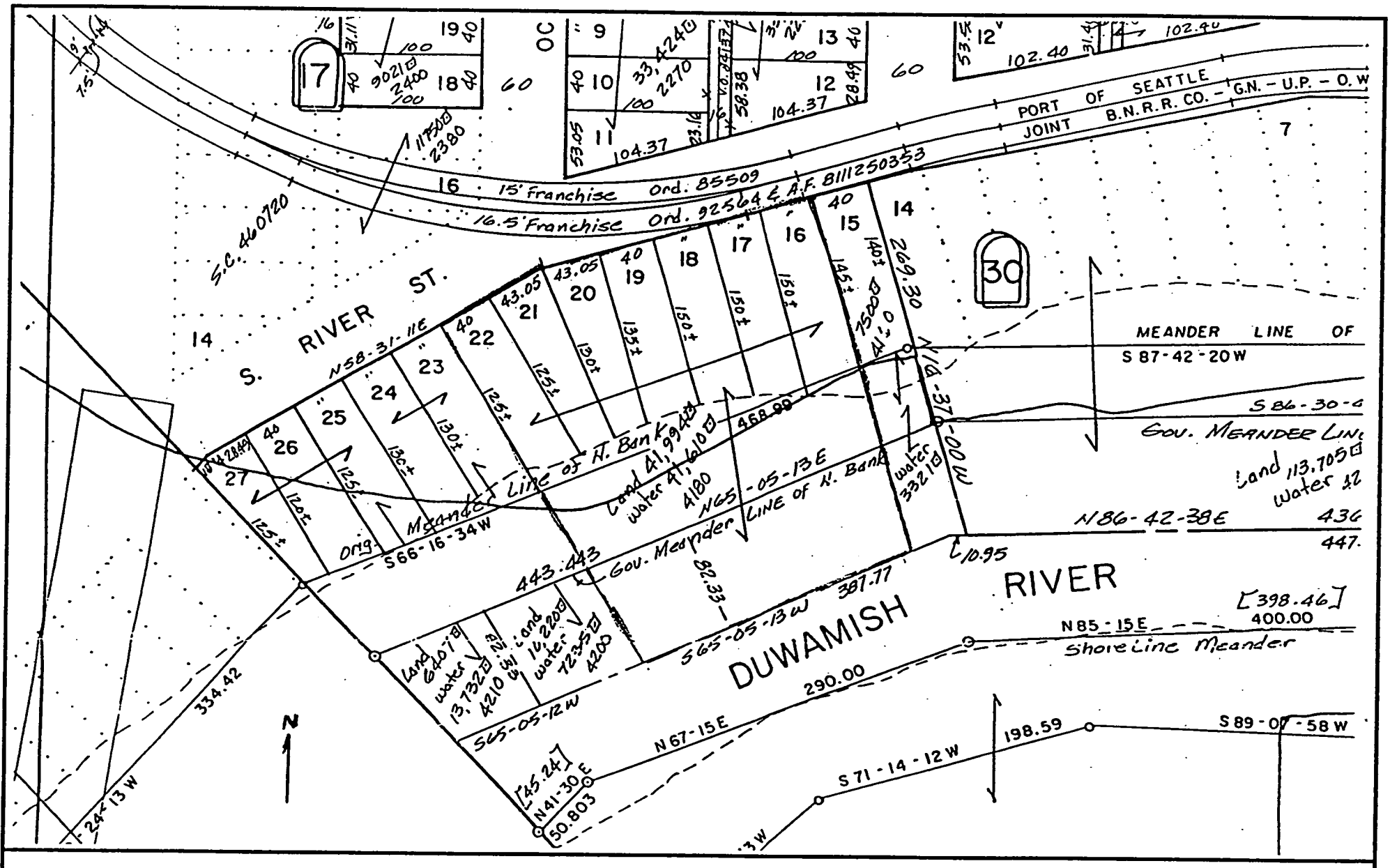


FIGURE 1. PARCEL MAP SHOWING SUBJECT PROPERTY

Table 1- Dredging

TABLE 1
BUDGETARY COST ESTIMATE: DREDGING
SILVER BAY PROPERTY - SLIP 3

Project Element	Units	Unit Cost	Quantity	Cost (Nearest \$1,000)
Sediment Sampling/Testing	ea	\$ 25,000	1	\$ 25,000
Turbidity Control/Water Testing	ea	\$ 15,000	1	\$ 15,000
Project Design/Permitting	ea	\$ 34,700	1	\$ 35,000
Mobilization	ea	\$ 5,000	1	\$ 5,000
Dredging	cy	\$ 1.50	57,250	\$ 86,000
Dewatering&Water Tmt	gal	\$ 0.20	149,881	\$ 30,000
Stockpile on Barges	cy	\$ 0.91	1,378	\$ 1,000
Pretreatment	cy	\$ 15	1,378	\$ 21,000
Load Trucks	cy	\$ 2.58	1,378	\$ 4,000
Haul/Dispose - DW Landfill	cy	\$ 250	2,090	\$ 522,000
Misc/Contingency (25%)				\$ 186,000
			Total:	\$ 930,000

note: does not include long-term monitoring costs

Table 2 - Capping

TABLE 2
BUDGETARY COST ESTIMATE: CAPPING
SILVER BAY PROPERTY - SLIP 3

Project Element	Units	Unit Cost	Quantity	Cost (Nearest \$1,000)
Sediment Sampling/Testing	ea	\$ 25,000	1	\$ 25,000
Project Design (10%)	ea	\$ 3,900	1	\$ 4,000
Permitting (5%)	ea	\$ 1,950	1	\$ 2,000
Mobilization	ea	\$ 2,500	1	\$ 3,000
Cap Material				\$ -
Sand	cy	\$ 5.01	1,166	\$ 6,000
Monitoring/Turb. Control	ea	\$ 5,000	1	\$ 5,000
Contingency/Misc. (25%)				\$ 11,000
			Total:	\$ 56,000

note: does not include long term monitoring or O&M costs.